VoiceFinder AP1002

VoIP Gateway

Installation Guide

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About This Guide

This chapter outlines the structure of VoiceFinder AP1002 VoIP Gateway Installation Guide and explains the symbols and legends.

[Organization]

The VoiceFinder AP1002 VoIP Gateway Installation Guide is offered to assist the operation VoiceFinder AP1002 VoIP Gateway. This manual is composed of 4 chapters.

Experienced users may refer directly to the related chapters. However, less experienced users are highly recommended to thoroughly review this manual before operation of the gateway.

- Chapter 1 『**VoiceFinder AP1002 VoIP Gateway Overview**』 provides an introduction to the H/W and S/W of VoiceFinder AP1002 VoIP Gateway and how to apply for the technical supports.

- Chapter 2 『**Before Installation**』 provides an explanation on the installation environment and cable requirements along with recommendations for safe operation of the equipment.

- Chapter 3 『**Gateway Installation**』 explains the basic installation information on connecting the gateway with cables, operating Console terminal and etc.

- Chapter 4 『**Appendix**』 includes the specification of the gateway, the cable and etc.

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The revision history of VoiceFinder AP1002 VoIP Gateway Installation Guide is as follows.

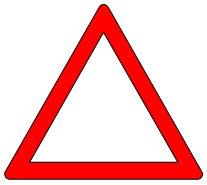
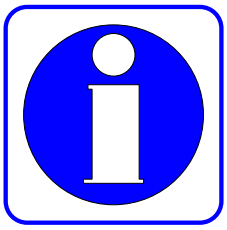
Revision No.	Date	Comments	Written by
Version 1.0	June 2003	1st Edition	AddPac R&D Center

[Symbols and Legends]

The symbols and legends used in this User's Manual are as follows:

- Commands and Keywords are typed in **Bold**.
- Variables that require user inputs are typed in *Italic*.
- Square brackets ([]) are optional values.
- Keywords that are required but need to be selected are grouped in braces ({}) and are separated by Slashes (/).
- Angle brackets (<>) are required parameters must be inputted.

The following conventions are also used to attract the user's attention.

Danger	**Danger** This symbol signals possible danger. Misuse could result in physical injuries. Please follow the instructions to avoid any electronic shocks.
Warning	**Warning** It warns the users to be careful with the operation. Otherwise, it could result in hardware damage of the equipment or loss of data.
Caution 	**Caution** This symbol calls for the user's caution. Otherwise, it could result in hardware damage of the equipment, loss of data or system configuration.
Information 	**Information** This symbol indicates additional information offering detailed information for understanding this user guide.

Chapter 1. VoiceFinder AP1002 VoIP Gateway Overview

Introduction to VoiceFinder AP1002 VoIP Gateway

Information

VoiceFinder AP1002 VoIP Residential Gateway offers Voice over IP service by connecting Local Area Networks, Wide Area Network or broadband network of ADSL.

The below is the network diagram using VoiceFinder AP1002 Gateway.

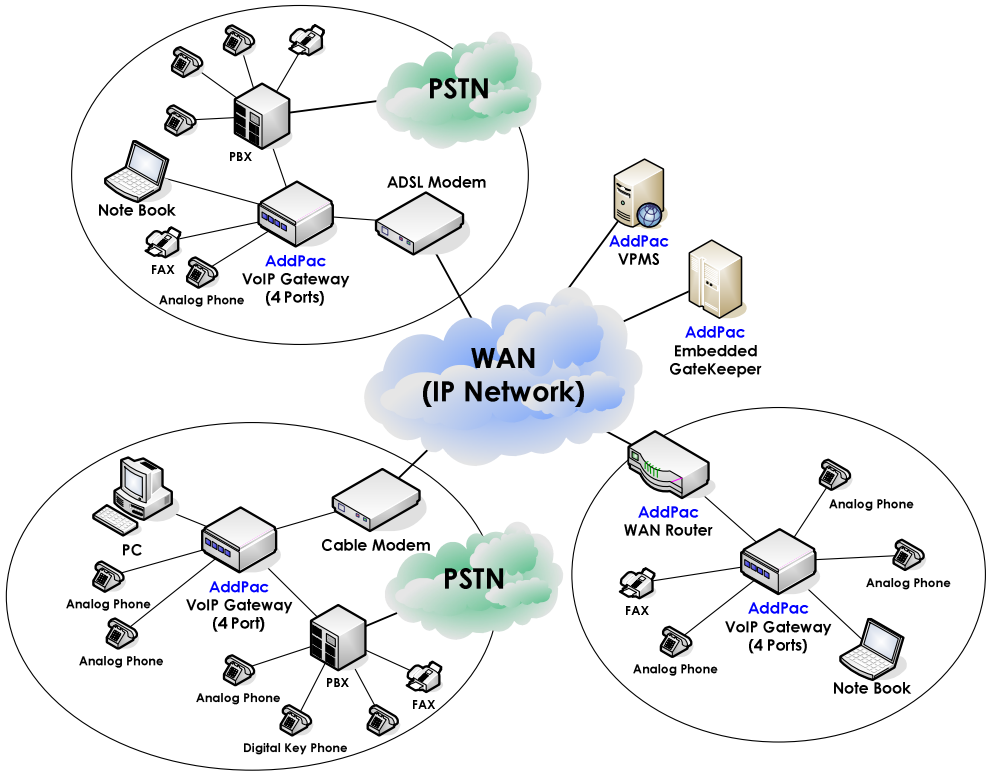


Figure 1-1: The network diagram using VoiceFinder AP1002 Gateway

It supports IEEE Spanning Tree Bridging function and it can be used for routing of both small and large-scale networks.

VoiceFinder AP1002 Gateway supports inter-operability with carrier-class backbone gateways, gatekeepers and routers along with existing AddPac VoIP gateway series realizing easy installation and maintenance.

The below figure is the exterior view of VoiceFinder AP1002 Gateway.

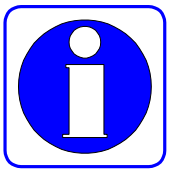
Figure 1-2: The exterior view of VoiceFinder AP1002 Gateway

As a supplementary service, VoiceFinder AP1002 Gateway provides Packet Filtering and Firewall function using Access List method. The Firewall function restricts access to the local network from outside networks using source and destination IP address access list information at the Network Layer (IP Layer) and at the Transport Layer (TCP/UDP Layer).

Also, using DHCP (Dynamic Host Configuration Protocol), this equipment can assign IP addresses to network clients automatically (DHCP server mode) and can receive a dynamically assigned IP address from a DHCP Server (DHCP client mode). VoiceFinder AP1002 Gateway solves the IP address shortage problem by using NAT (Network Address Translation) protocol.

Main Features

Information



VoiceFinder AP1002 Gateway provides high-performance Voice over IP (VoIP) solution maintaining best voice quality with the latest voice compression algorithm and offers high-speed Internet access service for small enterprises, government and other public offices. It is equipped with a WAN port (10Mbps Ethernet Port) for XDSL modem connection and up to 2 FXS and FXO voice interfaces.

Especially, VoiceFinder AP1002 Gateway is the ultimate solution for Small Medium Enterprise (SME) environment with its superior price vs. performance ratio. It is ideal for both enterprise users and ordinary house with high-speed Internet subscribers of ADSL and cable modem.

Also, VoiceFinder AP1002 Gateway is easy to install and operate, even for first time users and offers Static, RIP v1/2 and OSPF v2 routing function. It is the most economic and effective solution for high-speed Internet access VoIP residential gateway.

Hardware Description

VoiceFinder AP1002 Gateway offers the various network interface and ample system memory based on latest Embedded H/W technology and system memory. The main H/W features are as followings.

- High Performance WAN-to-LAN Residential VoIP Gateway
- High Performance LAN-to-LAN routing solution
- High Performance 32bit RISC Microprocessor
- Stable, Fixed Network interface structure
- 1-Port 10Mbps Ethernet Interface for WAN Interface (RJ45)
- 1-Port 10Mbps Ethernet Interface for LAN Service (RJ45)
- 2-Port FXS Voice Interface (RJ11)
- 2-Port FXO Voice Interface (RJ11)
- 1-Port Async Serial Interface for Console Port (RJ45)
- Compact, stylish design
- AC-DC External Power Supply Adapter
- Various System LEDs

Voice over IP Service

- VoiceFinder AP1002 Gateway supports voice and data integration service, VoIP service.
- Offers 4-channel voice ports and offers VoIP service by interoperating with PBXs, ordinary telephones and fax machines.
- Supports industry standard VoIP protocols such as H.323, SIP and MGCP.
- High performance DSP supports various voice compression algorithms such as G.723.1, G.729.A, G.711 and etc.
- Supports various voice-processing functions of VAD, DTMF & FAX Tone auto detection, CNG, Echo Cancellation and etc.
- Supports T.38 G3 FAX Relay.
- Interoperable with H. 323 based Gateways and Gatekeepers
- Interoperable with SIP Proxy Servers
- Interoperable with MGCs

IP Routing Protocols

VoiceFinder AP1002 Gateway supports various IP routing protocols. The main IP routing features are followings.

- Supports various IP routing and bridging protocol
- Static, RIP v1/v2, OSPF v2 routing protocols
- Transparent Bridging (IEEE Spanning Tree Protocol)

Network Managements

VoiceFinder AP1002 Gateway supports various network management protocols and functions.

- Standard SNMP Agent (MIB v2), MIB II, Bridge MIB Support
- Consols function with Async. Port.
- Remote Management using Console, Rlogin, Telnet.
- Traffic Queuing
- Web based Managements

Security Functions

VoiceFinder AP1002 Gateway supports various security functions.

- Standard & Extended IP Access List for network security function.
- Enable/Disable for Specific Protocols
- Multi-level User Account managements
- Auto-Disconnect for Telnet/Console Sessions

Operation and Managements

VoiceFinder AP1002 Gateway supports following operation and maintenance features.

- System Performance Analysis for Process, CPU, Connection I/F
- Configuration Backup & Restore for APOS Managements
- Debugging, System Auditing, and Diagnostics Support
- System Booting and Auto-rebooting with Watchdog Feature
- Data logging as various format
- IP Traffic Statistics with Accounting

Other Scalability Features

VoiceFinder AP1002 Gateway supports various supplementary service functions.

- DHCP server and relay function for easy IP management
- NAT/PAT function for effective IP management
- Remote S/W upgrade with TFTP & FTP
- Industry standard Command Line Interface type operation
- Network Time Protocol (NTP)

Hardware Configuration and Network Interfaces

Information

This chapter explains the external form and network interfaces of VoiceFinder AP1002 Gateway.

VoiceFinder AP1002 Gateway Part & Description

VoiceFinder AP1002 Gateway is made by the high intensity ABS with compact design. The front panel of VoiceFinder AP1002 Gateway includes various LEDs indicating the operational status of the device. On the rear panel, there is a LAN0 interface for WAN connection and LAN1 interface for LAN connection.

Front View of AP1002

The front panel of VoiceFinder AP1002 Gateway includes various LEDs indicating the operational status of the device. The following figure is the external form of VoiceFinder AP1002 Gateway.

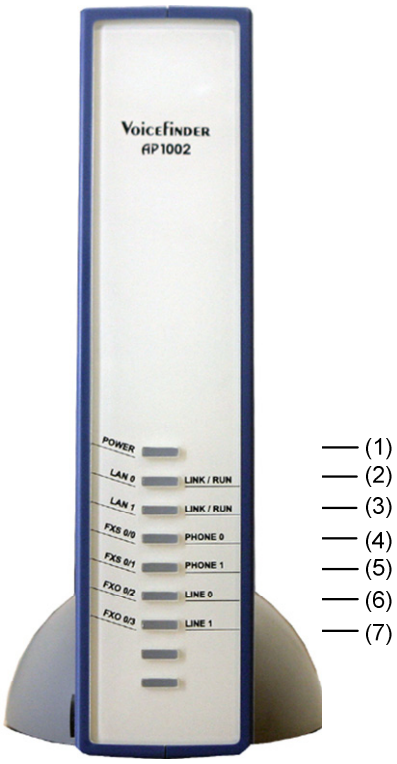


Figure 1-3: VoiceFinder AP1002 Gateway front view

Table 1-1 shows the functional explanation about each LED of VoiceFinder AP1002 VoIP Residential Gateway.

Table 1-1: The Front panel LEDs of VoiceFinder AP1002 Gateway

No.	LED	Description
(1)	POWER	Power LED, display whether external power is supplied normally or not. **(Green)**
(2)	LAN 0	LAN 0 LED, display the Ethernet port's status **(Green)**
	LINK/RUN	RUN LED, display whether the equipment is operated normally or not. **(Orange)**
(3)	LAN 1	LINK 1 LED, display whether Ethernet ports is in use or not. **(Green)**
	LINK/RUN	RUN LED, display whether the equipment is operated normally or not. **(Orange)**
(4)	FXS 0/0	FXS 0/0, display whether this port is in use or not. **(Yellow)**
	PHONE 0	Display the Operation Status of the number 0 Voice Port.
(5)	FXS 0/1	FXS 0/1, display whether this port is in use or not. **(Yellow)**
	PHONE 1	Display the Operation Status of the number 1 Voice Port.
(6)	FXO 0/0	FXO 0/0, display whether this port is in use or not. **(Yellow)**
	LINE 0	Display the Operation Status of the number 0 Line Port.
(7)	FXO 0/1	FXO 0/1, display whether this port is in use or not. **(Yellow)**
	LINE 1	Display the Operation Status of the number 1 Line Port.

Rear View of AP1002

The rear side of the VoiceFinder AP1002 VoIP Gateway includes 10Mbps Ethernet Interface for WAN/LAN interfaces, RS-232C serial port for management, and FXS/ FXO interface ports for voice signal processing. It can also form network environment for WAN-to-LAN routing service.

Figure 1-4 is the rear panel images of VoiceFinder AP1002 Gateway.

Figure 1-4: The rear panel images of VoiceFinder AP1002 Gateway

Also, following Table 1-2 explains the rear panel interfaces of VoiceFinder AP1002 Gateway.

Table 1-2: The parts and description on the rear panel of VoiceFinder AP1002 Gateway

No.	Interface	Explanation
(1)	DC Power	External DC Power Supply Input
(2)	FXS (0/0, 0/1)	2 FXS Ports: As FXS Voice Interface Ports, Phone or Fax Machine can be connected. (2 x RJ11)
(3)	FXO (0/2,0/3)	2 FXO Ports: As FXO Voice Interface Parts, PBX or PSTN line can be connected. (2 x RJ11)
(4)	LAN0	10Mbps Ethernet Port for WAN interface (RJ45)
(5)	LAN1	10Mbps Ethernet Port for LAN interface (RJ45)
(6)	Console	RS-232C serial port for system management (RJ45)

Network Interface

VoiceFinder AP1002 Gateway supports the following network interfaces:

- **1 Port 10Mbps Ethernet Interface for WAN**
- **1 Port 10Mbps Ethernet Interface for LAN**
- **1 Port RS232C Asynchronous Serial Interface**

With the above network interface, VoiceFinder AP1002 Gateway can establish WAN and LAN network supporting TCP/IP network protocol. So it can easily form VoIP network on the broadband network of ADSL and Cable Modem. Also, the Console port offers easy configuration of the gateway.

The next section explains the network interfaces of VoiceFinder AP1002 Gateway.

1-Port 10Mbps Ethernet WAN Interface (RJ45)

VoiceFinder AP1002 Gateway supports one (1) 10Mbps Ethernet Interface for WAN environment formation. It is a RJ45 type standard interface.

1-Port 10Mbps Ethernet LAN Interface (RJ45)

VoiceFinder AP1002 VoIP Gateway offers one (1) 10Mbps Ethernet interface to form Local Area Network (LAN). It is a RJ45 type standard interface.

1-Port Async. Serial Interface for Console Port (RJ45)

VoiceFinder AP1002 Gateway provides network management features using an RS-232C asynchronous serial interface port.

Voice Processing Interfaces

The fixed voice interface of VoiceFinder AP1002 Gateway can be connected to the ordinary telephones, fax machines and PBX.

- **FXS Interface voice processing port**
- **FXO Interface voice processing port**

VoiceFinder AP1002 Gateway is a network device offering not only data service, but also voice service at one device.

2- Port FXS Voice Interface

VoiceFinder AP1002 Gateway supports two (2)-port FXS (Foreign Exchange Station) Voice Interfaces. Using these FXS Voice Interfaces, VoiceFinder AP1002 Gateway provides analog line interface solutions, which can interface to general phone, FAX Machine, etc.

2- Port FXO Voice Interface

VoiceFinder AP1002 Gateway supports two (2)-port FXO (Foreign Exchange Office) Voice Interfaces. Using this FXO Voice Interfaces, VoiceFinder AP1002 Gateway provides analog Line Interface solutions that can interface to PBX, PSTN Line, etc.

Chapter 2. Before Installation

Installation Requirements

Warning The following recommendation should be followed for safe operation of the product.

- Ensure VoiceFinder AP1002 Gateway is in a dust-free environment before and after installation.
- Make sure to install VoiceFinder AP1002 Gateway on a flat and safe surface.
- To prevent accidents, be careful with ties, scarf, sleeves, and any other loose clothing from entangling with the chassis.
- Avoid any actions that may effect the equipment or the operator.

Electrical Requirements

Danger There are two main sources of electrical problems with VoiceFinder AP1002 Gateway: the power supply and static electricity.

This section describes safety recommendations for each case.

- **Electrical Safety**
  - ✓ Operate at a position where immediate shut-off of power supply is possible.
  - ✓ Turn off the power while installing the equipment.
  - ✓ Avoid operating the equipment alone at potentially dangerous environment.
  - ✓ Do not assume the power is switched off, but always confirm the power status.
  - ✓ Be extremely cautious when operating in a humid environment or with an ungrounded power extension cable.

- **Prevention of Static Electricity**
  - ✓ The main chip-set of the Gateway is very delicate and misuse may result in static electrical damage.
  - ✓ If a static prevention wrist strap is available, strap it around the wrist and earth the cord before operating the equipment.
  - ✓ If no wrist strap is available, earthening by holding a metal part of the Chassis will help prevent static electricity.

General Requirements

Warning

VoiceFinder AP1002 Gateway is ready for use where other electronic products can be used. However, the following conditions are recommended for maximum performance.

- A flat and well ventilated location.
- Secure the equipment safely at the desired place to install
- Do not place any objects on top of the equipment.
- A location without direct sunlight.
- Keep away from flammable, chemical, or magnetic objects.

Network Connection Requirements

Warning

Consider EMI Standard and distance limitation while installing VoiceFinder AP1002 Gateway.

The below explains PSTN cable, Ethernet cable, Console Cable of VoiceFinder AP1002 Gateway.

Necessaries

Unless ordered in advance, the tools and certain cables are not provided in the package. Prepare the following equipments and tools before the installation.

- Standard screwdriver set
- Cables for LAN and Console port connection
  - ✓ RJ-45 to RJ-45 cable for LAN port
  - ✓ RS-232C Console cable with RJ-45 connector (included in the package)
- Cable to connect Phone port
  - ✓ RJ-11 to RJ-11 ordinary telephone cable

Ethernet Port

VoiceFinder AP1002 Gateway offers two (2) RJ45 type 10BaseTX Ethernet Ports on the rear panel and LEDs are indicating the port status are on the front panel. The PIN information of the Ethernet cable, refer to Chapter 4.

RS-232C Serial Console Port

VoiceFinder AP1002 Gateway offers one (1) RJ-45 type RS-232C connector on the rear panel. This port is for the initial configuration, monitoring and debugging. The PIN information of the RS-232C Console cable, refer to Chapter 4.

Chapter 3. Gateway Installation

Unpacking

Before unpacking, check for external damage to the packaging box.

If no external damages are found, confirm if the following items are enclosed.

Table 3-1: VoiceFinder AP1002 Gateway package

No.	Item	Contents	Q'ty
1	VoiceFinder AP100X Gateway Main Body		1
2	Ethernet Cable (RJ45 to RJ45)		1
3	Console Cable (RJ45 to DB9)		1
4	Power supply External Adapter (110V/220V)		1

If any item is missing, immediately contact AddPac Technology Co. Ltd. customer support.

VoiceFinder AP1002 Interfaces and Cable connection

- Install VoiceFinder AP1002 Gateway at the suitable place illustrated at Chapter 2. .

Async Serial Interface Connection

- Connect RJ45 connector of RS-232C serial console cable to the Console port and connect the other side of the cable at the serial port of the PC.

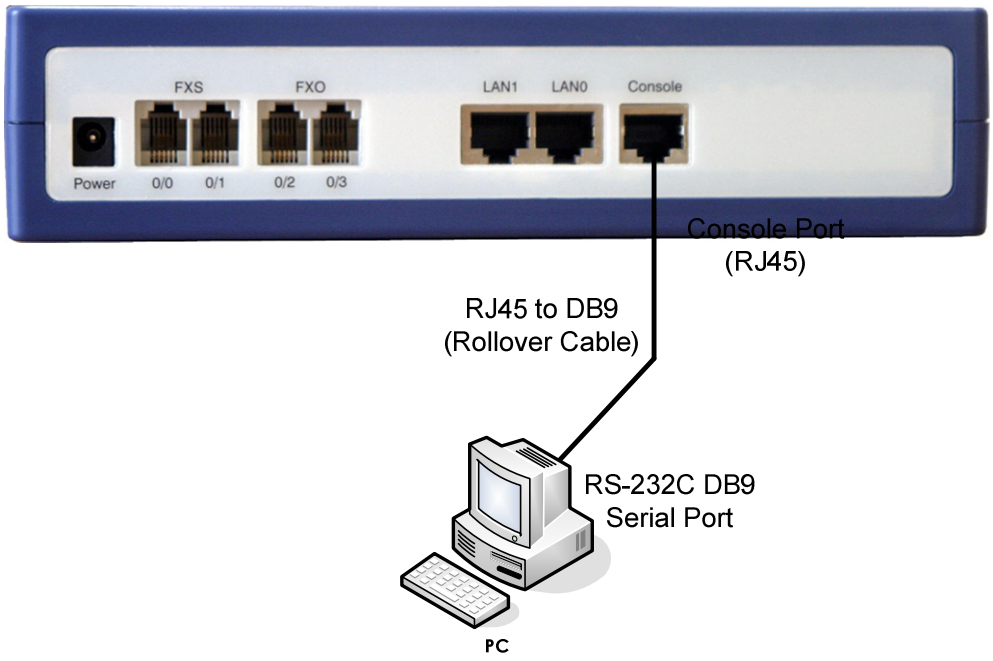


Figure 3-1: Connect VoiceFinder AP1002 Gateway and Console PC

Ethernet Interface Connection

- Connect LAN0 port of VoiceFinder AP1002 Gateway and WAN port of the LAN device with RJ45 UTP cable. Also, connect LAN1 interface with LAN interface of PC.

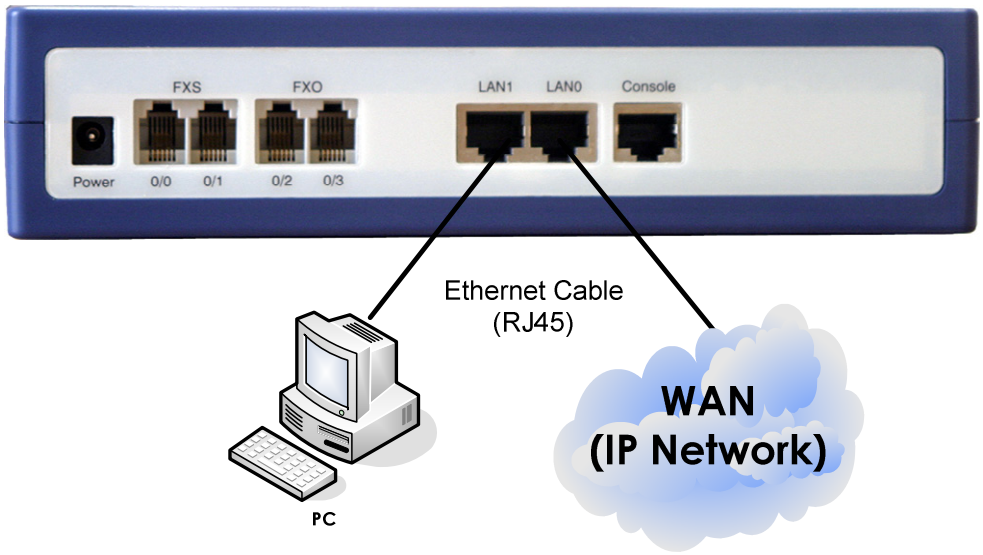


Figure 3-2: Connect VoiceFinder AP1002 Gateway with WAN and normal PC

FXS Voice Interface Connection

- Connect FXS port and analog phones with RJ11 cables.

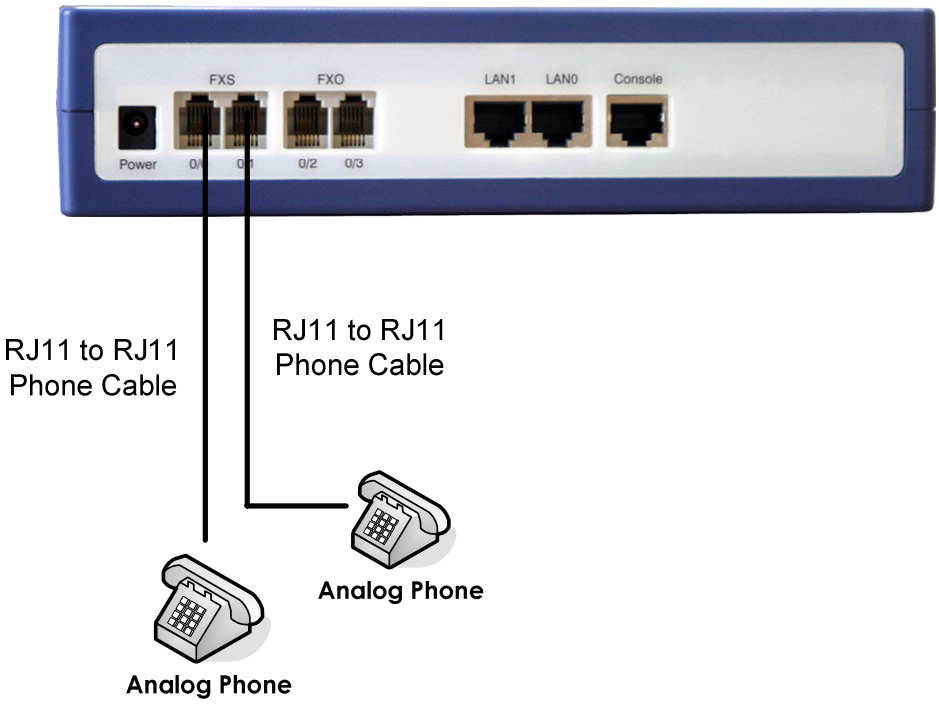


Figure 3-3: Connect VoiceFinder AP1002 Gateway and a normal telephone

FXO Interface Connection

- Connect FXO Interfaces to PBX (Private Branch eXchange) with RJ11 cable.

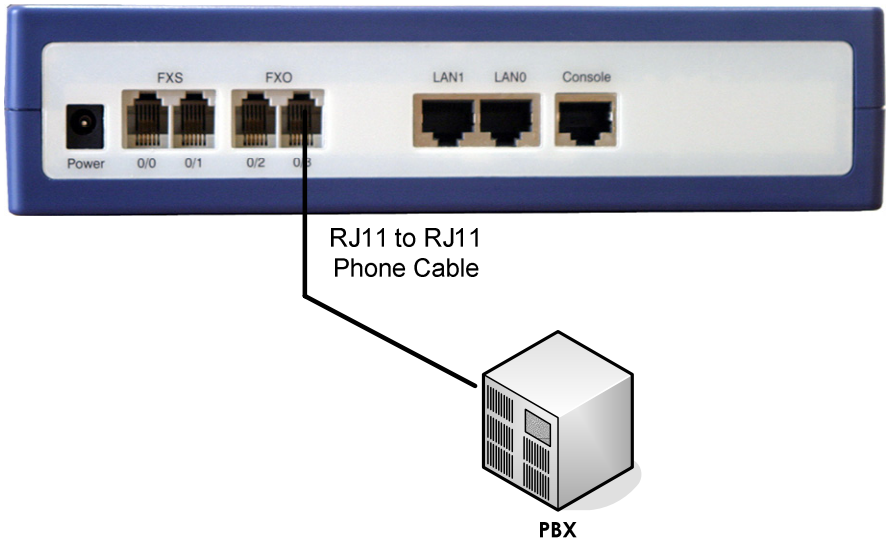


Figure 3-4: Connect VoiceFinder AP1002 Gateway and PBX

Booting

When power is supplied, the system is booted as described below

- VoiceFinder AP1002 Gateway performs a self-test and checks basic operations of the CPU, the memory and interfaces.

- The boot loader is executed, and the boot loader seeks for proper software image files. The boot loader loads the gateway software from the flash memory.

- If the boot loader cannot find proper software image file from the flash memory, the boot loader stands by in the boot mode until it receives proper software from the remote system. (At this time, the boot loader can download software through TFTP or FTP protocol.)

- When the software is loaded, the gateway starts to operate according to configuration information. However, if there is no configuration information, it operates according to the default values, and in this case, the operator shall set up related items for normal operation of the network.

Danger

After connecting all the interfaces, supply the power to VoiceFinder AP1002 Gateway. Supply the power after connecting the adapter to VoiceFinder AP1002 Gateway. Do not connect the adapter to the power supply before connecting it to the gateway. Also, use 110V adapter in case the power supply is 110V. However, the gateway detects both 110V and 220V, so there is no additional setting required.

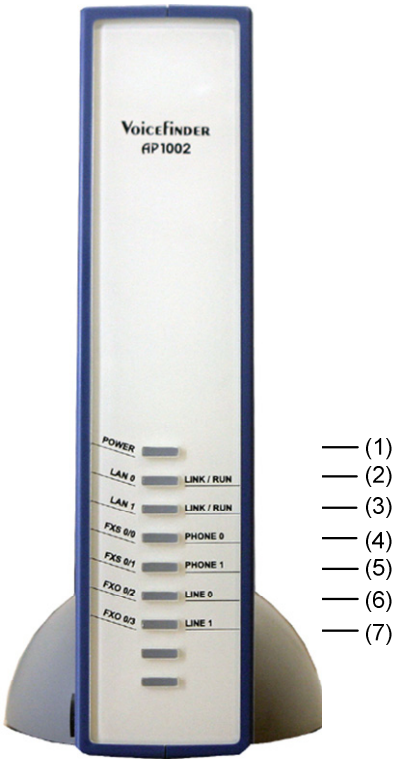


Figure 3-5: VoiceFinder AP1002 Gateway front view

Table 3-2 shows the functional explanation about each LED of VoiceFinder AP1002 VoIP Residential Gateway.

Table 3-2: The Front panel LEDs of VoiceFinder AP1002 Gateway

No.	LED	Description
(1)	POWER	Power LED, display whether external power is supplied normally or not. **(Green)**
(2)	LAN 0	LAN 0 LED, display the Ethernet port's status **(Green)**
	LINK/RUN	RUN LED, display whether the equipment is operated normally or not. **(Orange)**

(3)	LAN 1	LINK 1 LED, display whether Ethernet ports is in use or not. **(Green)**
	LINK/RUN	RUN LED, display whether the equipment is operated normally or not. **(Orange)**
(4)	FXS 0/0	FXS 0/0, display whether this port is in use or not. **(Yellow)**
	PHONE 0	Display the Operation Status of the number 0 Voice Port.
(5)	FXS 0/1	FXS 0/1, display whether this port is in use or not. **(Yellow)**
	PHONE 1	Display the Operation Status of the number 1 Voice Port.
(6)	FXO 0/0	FXO 0/0, display whether this port is in use or not. **(Yellow)**
	PHONE 2	Display the Operation Status of the number 2 Voice Port.
(7)	FXO 0/1	FXO 0/1, display whether this port is in use or not. **(Yellow)**
	PHONE 3	Display the Operation Status of the number 3 Voice Port.

- To check the operation status of VoiceFinder AP1002 Gateway, check the '(1) POWER LED' and '(2)LAN0 LED & (3)LAN1 LED' indicating Ethernet Link.

Use Console terminal with HyperTerminal

- To use a PC as a Console terminal, the communication emulator application should be installed. When the PC is MS-Windows line, use the HyperTerminal Application.

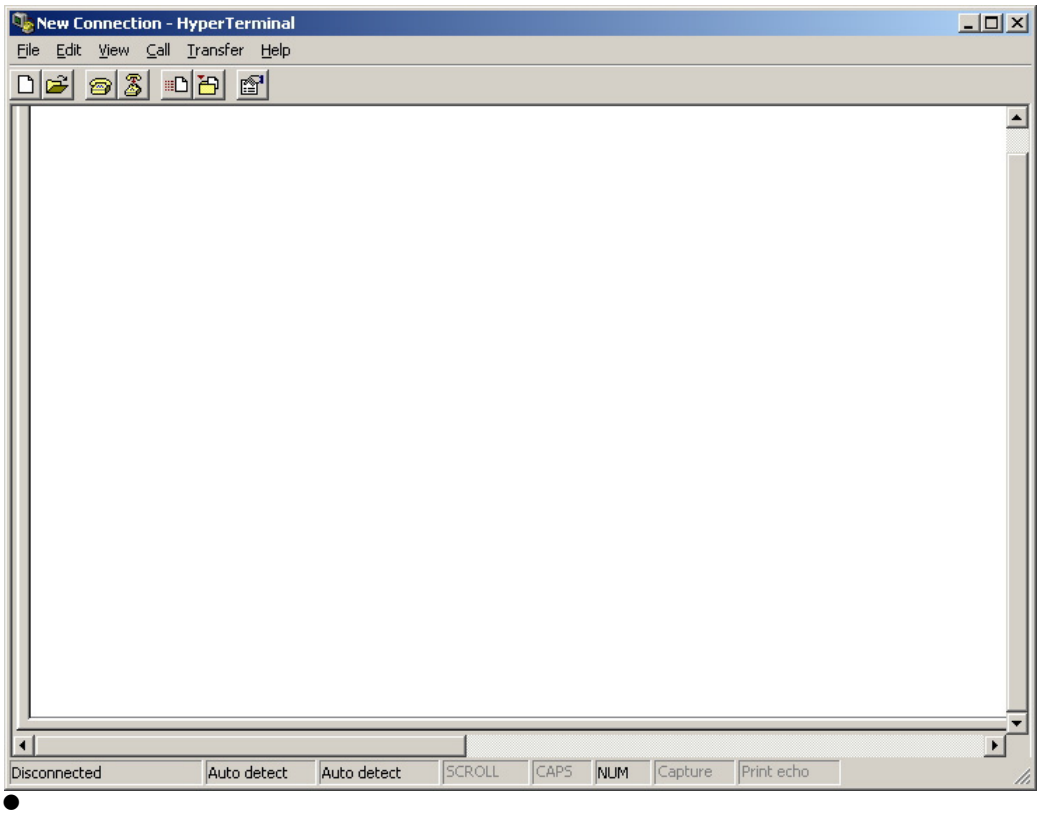


Figure 3-6: MS-Windows Communication Emulator HyperTerminal

- Assign a name to the connection. “AddPac” is used at the below example.

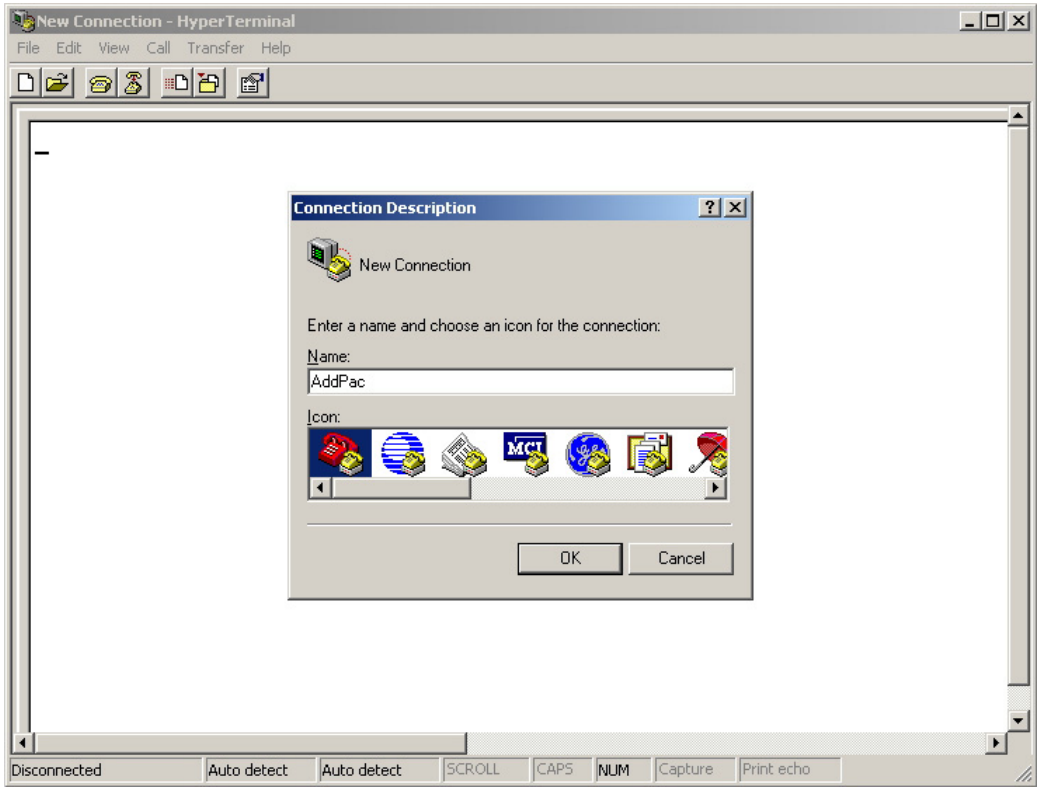


Figure 3-7: Assign a name for the new connection

- Select the interface whether the Console cable is connected. Typically, the Console cable is connected to the RS-232C 9Pin Serial Port, so select the right port according to the user environment. “COM1” is selected at the below example.

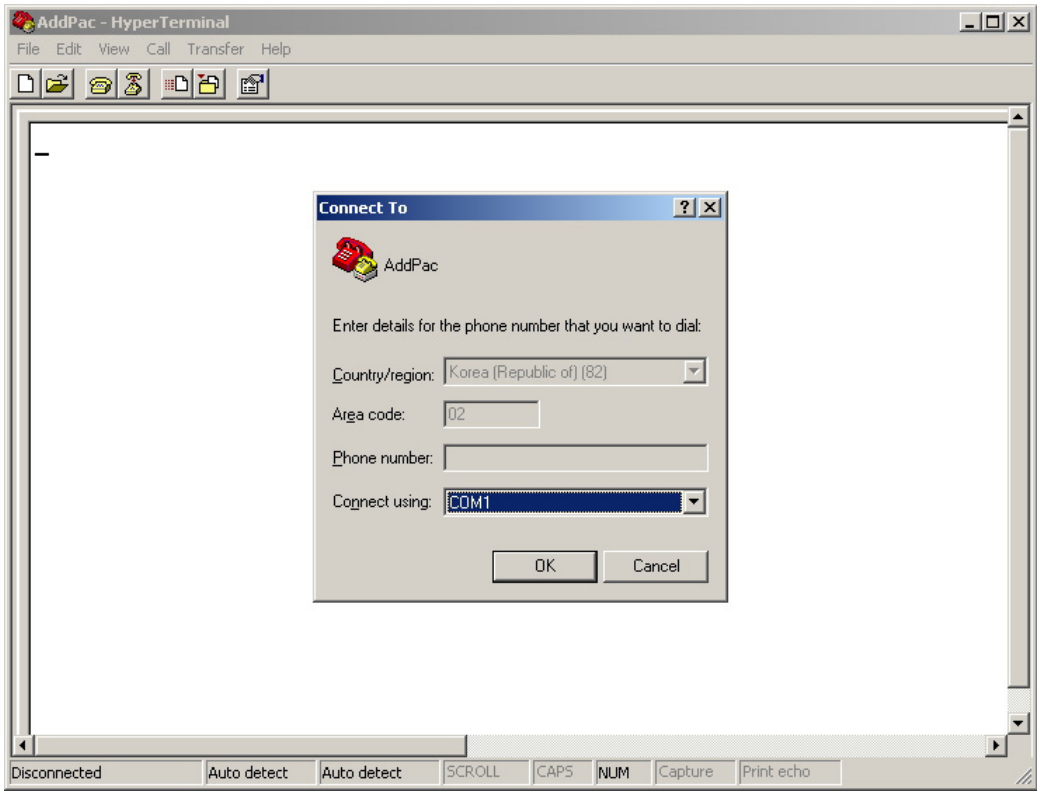


Figure 3-8: Select the interface for Console cable

- Set the port information. The below examples is based on “COM1” port.

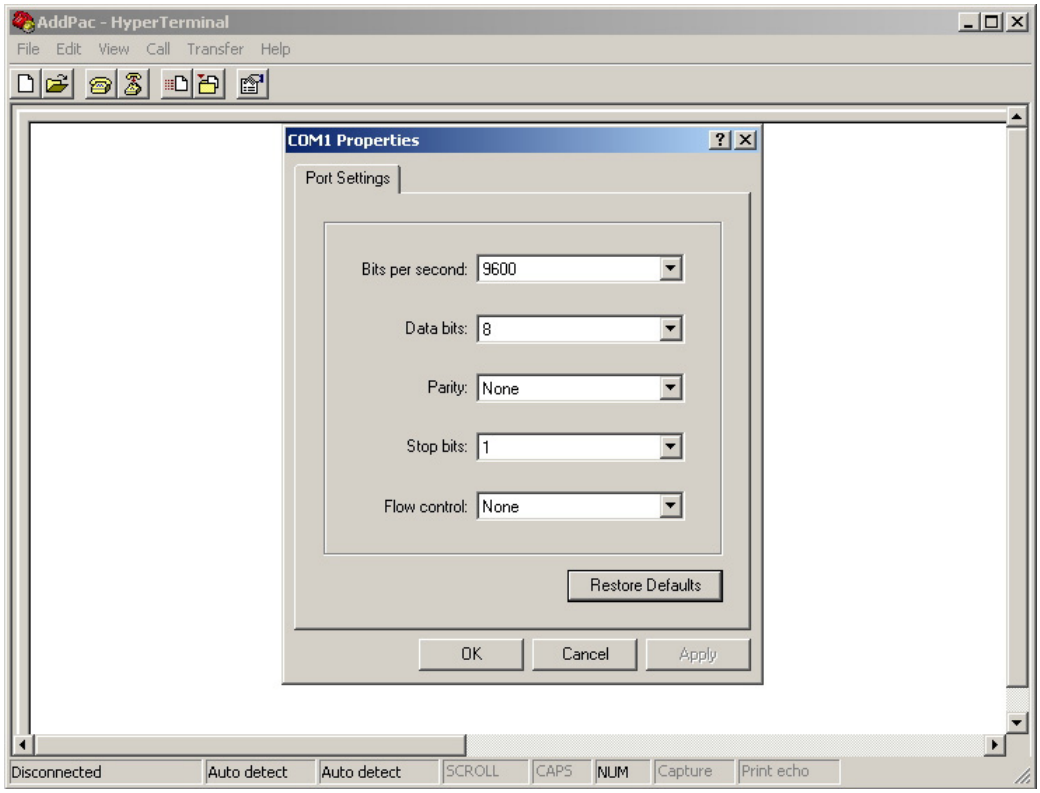


Figure 3-9: COM1 Properties

- After the configuration, press “Enter” button, then the below message will be displayed on the HyperTerminal. This message shows the routing S/W version, Gateway H/W test result, memory and etc.

```
System Boot Loader, Version 1.4.6/MEM
Copyright (c) by AddPac Technology Co., Ltd. Since 1999.



System Bootstrap, Version 1.2
Decompressing the image:
################################################################
#############
################################################################
#############
##########################################################[OK]

VoiceFinder Gateway Series (AP1002)
Serial Number: AP1002-ffff5a
32BIT RISC Processor With 33554432 Bytes System Memory
524288 Bytes System Flash Memory
2097152 Bytes 2nd System Flash Memory

1 RS232 Serial Console Interface
2 Ethernet/IEEE 802.3 Interface

AP1002 System software Revision 8.10
Released at Thu Jun  3 00:00:00 2004
Program is 1766884 bytes, checksum is 0xe2433ff

Local Time : Sun Jan  4 23:15:49 1970
Copyright (c) by AddPac Technology Co., Ltd. Since 1999.

Voice Module type (0): S&O
```

```
VOIP_INTERFACE_UP : (10.1.1.50)

Interface ethernet0.0, changed state to UP
Voice Module Ready
DSP S/W download (0): .... OK


The System is ready. Please login to system.
login: Gatekeeper shutdowned.

VoIP in service.
```

Figure 3-10: The HyperTerminal message of VoiceFinder AP1002 Gateway

- With the log-in message, input the user name “root” and the password “router”. After the log-in process, the prompt “router#” is displayed on the console terminal.

- There are two types of prompts used for VoiceFinder AP1002 Gateway: “router>” and “router#”. The “ **>** ” prompt indicates that the user is not an administrator. With this prompt, the user is unable to use certain commands: particularly the configuration commands. The “ **#** ” prompt indicates that the user is an administrator (or root), and the user is authorized to use all the functions and commands.

- Log-in as “Admin” allows to change settings. Therefore, it is advised to change the default password for security purposes. Refer to Quick Operation Guide & APOS Operation Guide for password change and detailed configuration.

Chapter 4. Appendix

VoiceFinder AP1002 Gateway Technical Description

This Chapter explains the supported Technical Specification of VoiceFinder AP100X VoIP Gateway.

(* means that the item is not yet implemented.)

IP Routing Service

IP Routing Protocols	Static
	IEEE 802.1Q VLAN Routing

LAN Service

Ethernet Interface	10Mbps Ethernet Interface
Configuration Management	Port Configuration
	Secondary/Subnet Support
	MTU Size Change
	ARP Entry Revalidate Function
	Transmit/Receive Connection Recovery Function

Voice over IP Service

VoIP Protocols	ITU-T H.323 Protocol with ITU-T H.235 Security Feature
	Session Initiation Protocol (SIP)
	MGCP
Voice Compression	G.723.1 MP-MLQ, 6.3Kbps, 5.3Kbps
	G.729.A CS-ACELP, 8Kbps
	G.711 PCM, 64Kbps
Voice Processing	Voice Activity Detection (VAD)
	T.38 Protocol (FAX)
	Dual Tone Multi Frequency (DTMF)
	Comfort Noise Generation (CNG)
	Echo Cancellation

Network Managements

SNMP	Standard SNMP Agent MIB v2
Web	Web Based Management using HTTP Server Interface
Others	Traffic Queuing
	Frame-Relay Flow Control

Security Functions

IP Access List	Standard and Extended IP Access List, IP Packet Filtering
PPP User Authentication	Password Authentication Protocol (PAP)
	Challenge Handshake Authentication Protocol (CHAP)
Others	Access Control and Data Protections
	Enable/Disable for Specific Protocols
	Multi-level User Account Management
	Auto-disconnect for Telnet/Console Sessions

Operation and Managements

Console Port	RS-232C Based Async Serial Interface Support
Remote Management	Console, RlogIn, Telnet
System Performance Analysis	Process, CPU, and Connection Interface
APOS Management	APOS Configuration Back-up and Restore
	Remote Upgrade Function using FTP/TFTP
Others	Debugging and System Auditing
	Data Logging and Diagnostics
	System Booting, Auto-rebooting with Watch-dog Timer
	IP Traffic Statistics with Accounting

Other Scalability Features

DHCP	Dynamic Host Configuration Protocol (DHCP) Server and Relay Functions
NAT/PAT	Network Address Translation (NAT) Protocol
	Port Address Translation (PAT) Protocol
Bridging	IEEE Standard Spanning Tree Bridging Protocol
	Remote Bridging Support
	Concurrent Bridging Support

User Interface	Industry Standard Command Line Interface (CLI)
Others	Network Time Protocol (NTP) Support

Hardware Specification

Microprocessor	32bit RISC Microprocessor
Network Interface	1-Port 10Mbps Ethernet Interface for WAN (RJ45)
	1-Port 10Mbps Ethernet Interface for LAN (RJ45)
	1-Port Async Serial Interface for RS-232C Console Port (RJ45)
Voice Interface	2-Port FXO Voice Interface (2 x RJ11)
	2-Port FXS Voice Interface (2 x RJ11)
Memory	2MB Flash Memory
	32MB SDRAM / Main Memory
	512KB Boot Flash Memory
System LED	LAN, WAN, Power LED (Front Panel)
Power	DC External Power Supply (5V x 4A)
Power Requirement	10 Watt
Operating Temperature	0°C ~ 55°C
Storage Temperature	-40°C ~ 85°C
Relative Humidity	5% ~ 95%
Cooling Method	Internal heat resistance
Width x Height x Depth	50 x 210 x 210 (mm)
Weight	655g

Cable Specification

This Appendix provides information about the Pinout specifications of the following cables used with VoiceFinder AP1002 Gateway.

- Console Port Signal and Pinout (RJ-45 to DB9)
- Ethernet Cable Assemble (RJ-45 to RJ-45) Pinout

[Console Port Signal & Pinout]

In order to connect the gateway console port with the Terminal Emulating PC, the RJ-45 to DB9 (Female DTE Connector) cable is used. The transferred signal and Pinout specifications are enlisted in the following table.

Table 4-1: The transferred signal and Pinout specification

Gateway Console (DTE)	RJ-45	DB-9	Console Device (PC)
Signal	RJ-45 Pin	DB-9 Pin	Signal
RTS	1	8	CTS
DTR	2	6	DSR
TxD	3	2	RxD
GND	4	5	GND
GND	5	5	GND
RxD	6	3	TxD
DSR	7	4	DTR
CTS	8	7	RTS

[Ethernet Cable Assemble (RJ-45 to RJ-45) Pinout]

In order to connect the gateway with other equipments (i.e. HUB), the RJ-45 to RJ-45 Ethernet Cable is used. The RJ-45 Connector Pin sequence is provided below and the transferred signal and Pinout specifications are enlisted at the below table.

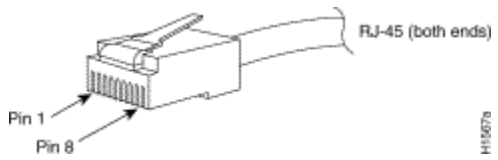


Figure 4-1: 10Base-T RJ-45 Connector

Table 4-2: Signal and Pinout of Direct Ethernet Cable

RJ-45	Signal	Direction	RJ-45 Pin
1	**Tx +**	→	1
2	**Tx -**	→	2
3	**Rx +**	←	3
4	**-**	**-**	4
5	**-**	**-**	5
6	**Rx -**	←	6
7	**-**	**-**	7
8	**-**	**-**	8

1. These specifications are for serial cables connecting the gateway and the HUB.
2. For gateway to gateway or gateway to PC connection, the Cross Cable must be used.